



**Department of
Environmental Protection
Bureau of Land & Water Quality January 2005
O&M Newsletter**

A monthly newsletter for wastewater discharge licensees, treatment facility operators and associated persons.

SOP Correction

The description of the E.Coli test in our laboratory QA/QC standard operating procedures (SOP) prepared by MWWCA has an error. When making the urea substrate for the E. Coli test you should add 0.01 grams of phenol red per 100 ml of substrate instead of the 0.1 grams reported in the SOP.

Don Albert

Enforcement News

At its November 17, 2004 meeting, the Board of Environmental Protection approved an Administrative Consent Agreement and Enforcement Order with a water district in southern Maine. The Agreement contains a monetary penalty of \$42,713 and requires that the water district conduct an Operations Evaluation Report by June 1, 2005 and complete any appropriate corrective actions by January 1, 2007.

Violations at the facility include failing to do all required monitoring/testing, failing to properly chlorinate the effluent, discharging wastewater from pump stations during dry weather, and exceeding effluent limits (primarily fecal coliform bacteria).

John Glowa

Weekly Averages--Are You Doing This Right???

Lately, while doing inspections and reviewing DMR reports I have noticed that a fair amount of operators are not calculating their weekly average data correctly. This really isn't that surprising because there used to be some inconsistencies between how DEP and EPA wanted you to do this. Not everyone has a weekly limitation in their Permit but those that do should pay close attention. To make life easier for everyone, the DEP has created the MPDES Permit Program Instructions for State DMR's. If you don't have this document then ask your inspector for one. Once you get it turn to pages 14 through 18 and enjoy reading about how to correctly calculate weekly average data. For those that can't wait for the answer here is a brief summary of what it says.

A calendar week runs from Sunday through Saturday, inclusive. When a calendar week begins in one month and ends in the next, compliance with the weekly reporting requirements should be reported on the DMR for the month in which the week ends. Reporting weekly data in this way avoids the potential for splitting up a week that spans 2 different months and having 2 different weekly average or weekly maximum results for

the same week. For example, the last day of December 2004 is on a Friday. If you collected weekly average data that last week of December it has to be included on the January DMR for weekly average reporting purposes. I know this sounds confusing but once you get used to the routine you'll love it. Well, maybe not, but at least you'll be calculating and reporting this data correctly.

Monthly average and daily maximum data is generated strictly on a calendar month basis. So, the Sunday through Saturday criteria does not apply for that data. In the past, inspectors have indicated that weekly average and daily maximum results will always be the same number if you only monitor for a parameter once per week. As you can see this may not be true if you calculate your weekly average data correctly. A correction will be made on page 18 of the DMR Instructions to indicate the weekly average and daily maximum **may not be** the same number. Department staff recognizes this all sounds somewhat confusing so take a few moments to read the DMR Instructions or call your inspector for assistance. If you already are doing this correctly then keep up the good work!

Clarissa Trasko

DMR-QA Study 24 Update

Thank you to all wastewater treatment facility operators that participated in the 2004 Discharge Monitoring Report – Quality Assurance Study 24. I have received the evaluations from the various provider laboratories if the Data Report Forms were submitted by midnight on the individual provider's

reporting deadlines. As in 2003, I did not require copies of the permittee "data packages". (EPA New England does not require them either.) Of course, as Maine is a delegated state, your primary regulatory authority is Maine DEP for the purposes of these DMR-QA studies. You should always maintain copies of data packages sent to your provider laboratories for at least three years.

Permittees receiving "Not Acceptable" evaluations should have investigated the causes of any discrepancies reported by their provider laboratories. The causes and any corrective actions to prevent laboratory errors in the future should have been detailed in a letter sent to Ken Jones by December 8, 2004. A copy of this letter should be sent to your compliance inspector as well. We both want to help you improve your laboratory work. Technical assistance is available from DEP staff to WWTF operators for lab issues as needed. Call your facility inspector or me (287-4869) for help in routine lab procedures.

Don't forget to use the Wastewater Laboratory Quality Assurance/Quality Control training provided by JETCC in June 2004. A CD-ROM version of the Quality Assurance Manual developed by Katahdin Analytical Services was distributed in November 2004. A copy of the revised MWWCA Laboratory Manual (May 2004) was included on the CD-ROM. This information should provide you with some useful guidance when trouble-shooting lab problems.

You will receive a telephone call from me if I cannot locate your corrective action letter for 2004. If you mailed it, I will ask you for a copy of it if I did not receive it. I may also call if I need more

information on your proposed solutions to any analytical problems discussed in your letter. You should explore any “Check For Error” results as well. This would indicate that some of your results are marginal at present. You should try to optimize that lab procedure now before it perhaps becomes “Not Acceptable” later.

The vast majority of Maine WWTF labs received “Acceptable” evaluations again in 2004. Congratulations to all of you laboratory technicians that are doing good lab work out there. Your regional compliance inspector and I appreciate your efforts to report accurate DMR data.

Ken Jones
State DMR-QA Coordinator

For Practice

1. The term Chlorine Demand means
 - a. The chlorine dosage required to kill all the coliform bacteria present.
 - b. The amount of chlorine added to achieve a certain concentration in the effluent before it goes to the contact tank.
 - c. The chlorine dosage added to the residual divided by two
 - d. The chlorine dosage minus the chlorine residual in the effluent
2. Given the following data, how much sludge should be wasted?
Plant flow: 450,000 gallons/day
Current MLSS: 2256 mg/L
Target MCRT: 18 days
Aeration Tank Volume: 250,000 gallons
Return Sludge Conc. 8000 mg/L
Effluent TSS: 18 mg/L
 - a. none
 - b. 2,196 gallons
 - c. 2,893 gallons
 - d. 1,157 gallons
3. When figuring the amount of flow that can go through a pipe, the “C” factor in the equation is a measure of:
 - a. the interior roughness of the pipe
 - b. the circumference of the pipe
 - c. the cross-sectional area of the pipe
 - d. the cost-diameter ratio
4. A sand having perfect uniformity would have a uniformity coefficient of
 - a. Infinity
 - b. 1.0
 - c. 1.8
 - d. 0.0



Financial Management

Article 5 – Setting Rates

Setting Rates – The Last Step in the Financial Management Process

This is the last of our articles on Financial Management. We have looked at Planning, Budgeting, and Accounting. Now, we will discuss how to use the information gained in those other processes to set fair and equitable rates for your customers. Much of the following material is based on a training class given by the Missouri Department of Natural Resources. The staff of that agency has developed an Excel spreadsheet model that allows users to input financial data from their system and get a reasonable rate structure from the model. Much of the material below comes from a daylong training class that staff from the Missouri DNR teach for water and wastewater operators in their state. The Missouri DNR “Show Me” ratemaker Excel model can be downloaded from the Missouri DNR Web Site

(<http://www.dnr.state.mo.us/oac/emiapps.htm>) or from the Maine DEP.

Taking a cue from David Letterman, we first present **The Top five reasons for analyzing your rates.**

5. The state is forcing you to upgrade your system and it is going to break you.
4. Your rates are very old and the system is going broke.
3. A big-ticket item died and fixing it made your system go broke.
2. You need grants and loans to keep your system from breaking.
1. If you raise rates for no good reason, the ratepayers will break your legs.

Whatever the reason, before you attempt to raise the rates you charge your customers, you have to “do your homework.” In the following paragraphs we will attempt to:

- ✍ Show how and why to analyze your rates.
- ✍ Show how to think about ratesetting.
- ✍ Show how to get follow-up help with your analysis.

Before you begin the process of revising your present rates, you need to ask and answer some basic questions

- ✍ Do our rates cover current costs?
- ✍ Will our rates cover future costs?
- ✍ Will we have money to handle repairs, replacements and unexpected expenses?
- ✍ Are our rates fair to our customers?
- ✍ Are we able to build new facilities?
- ✍ Are we going to apply for grants and loan?
- ✍ What if the economy, inflation and interest rates change?
- ✍ Is our population growing or declining?

Many of those questions were discussed in the article on Planning. They can be summed up by the following:

- ✍ Where are we now?
- ✍ Where do we want to be?
- ✍ How do we get there?

Or in EPA's terminology

- ✍ What is our technical, managerial & financial (TMF) capacity today?
- ✍ How will it look in the future?

Your ratesetting process should begin with a look at your entire system

- ✍ Technical - hardware and people who produce the service.
- ✍ Managerial - decision-makers and staff who support the technical.
- ✍ Financial - the money that makes it happen.

This is what is meant by TMF. Each part of the TMF capacity can be thought of as one leg of a three-legged stool. If any of the legs is weak or missing, the whole thing can come crashing down.

Types of rate structures

"Proportional to use" rates are based on the volume of water or sewer service each customer receives. Such rates are use neutral, which means that the rate per gallon does not go up or down as use increases or decreases. "Proportional to use" rates are simple to calculate and use, easy to understand.

"Cost to serve" rates are based on the costs that each customer or customer class causes the system to incur. These rates are also use neutral but they are somewhat harder to develop and implement than "proportional to use." rates

"Conservation" rates go up as volume usage goes up. Such rates encourage water conservation. While you may not be directly responsible for water use in your community, wastewater rates can work concurrently with water rates to promote water conservation.

"Declining" rates are the opposite of "conservation" rates in that they go down as use goes up. This encourages water use and is probably not in the best interest of the water or wastewater utility.

"Arbitrary" rates are ... whatever management says they will be. We really discourage this type of "ratesetting" in that it is not based on an analysis of the technical, managerial and financial aspects of the utility but on someone's whim and usually results in rates that are much too low or much too high.

The Ratesetting Process

Again, as we noted in the article on Financial Planning, the first step in financial management is analyzing your current operations to answer the questions, "where are we now?" and "where do we want to be?" Once you have completed that analysis, look at your existing operation and see if there are any realistic ways to reduce costs. Don't just say "we have to cut costs by 10%". Take a good, hard look at the operation and determine where you might potentially cut costs and how any cuts would affect your operation. This step will not only help you find potential cost reductions, but it will also help you respond to any criticism if and when you do go forward and propose a rate increase.

When you have identified and made, if appropriate, any cost reductions in your operation, you should then analyze your rates and develop proposed adjustments to those rates. It is usually best to analyze your rates frequently and make small adjustments. If you haven't raised rates in ten years and you've been running "in the hole" for the last three years, chances are any rate increase will have to be pretty dramatic, and you'll face a lot more opposition than if you had implemented a "cost of living" increase every year of two.

If rates have not been adjusted for years before you recently arrived, be brave. Blame your predecessor (if there is one), then propose one, or a short series of rate adjustments that will quickly get the rates where they should be. If you are part of a municipal government or a utility district that provides more than wastewater services, make sure you account for all utilities and municipal services separately; do not take in water revenue and spend it on sewer service, streets or other things.

Do the right thing, and be seen doing the right thing. This means that you shouldn't delay raising rates if they really need to be raised. Nobody likes to pay more for anything, but if you need to raise your rates to keep your facility operating properly, "face the music" and your ratepayers and propose the necessary adjustments to your rates.

It is very important to develop your Technical, Management, Financial analysis and show the ratepayers that strong TMF is needed to serve them as they desire. You should clearly demonstrate the need for adjustments. One way to do this is to compare your

proposed rates to the "do nothing" or current rates alternative. Show your customers the real need for a rate increase.

Always keep any meetings where rate increases are discussed open and have good records of those meetings available to the public. State law requires and common sense dictates that any procedure where the public's affairs are discussed be open and above board.

Remember that your rates are fees, not taxes. You are collecting directly for a service provided. Be able to show what that service costs to operate and how those costs have been translated into the rates you propose. People are usually more willing to pay for something they can "see and feel". Make your operations "real" to them.

Finally, as we mentioned in the last article, use generally accepted accounting principles. (Don't "do an Enron".) Make sure that your bookkeepers and/or accountants are following the principles set forth by the Governmental Accounting Standards Board (GASB). You don't want to show up on the 6 o'clock news being lead away in handcuffs like Ken Lay or Bernie Evers.

Before your rates come up for formal adoption, build support for those new rates. The following are some good guidelines for building support.

1. Get people informed! If you have a meeting, publicize it well and get people to attend.
2. Present your analysis using the software "live" if you're savvy and

- brave. Resize the worksheets so they will be easier to read when projected.
3. If you can't present "live," make color overheads of all the tables and charts and have them ready to show, if needed.
 4. Present only those tables and charts which will demonstrate your points and that you can explain well.
 - ✍ Beware of information overload. When people get overwhelmed, they want to reject whatever the proposal is.
 5. Clearly demonstrate the need for adjustments.
 - ✍ Show the current rates (the "do nothing") scenario first, so people have a basis to consider your proposed rates.
 6. Make it clear you are doing cost, revenue and rate projections, not politics
 7. If you are employed by the community, have an outsider on hand to help answer questions or even present the analysis if they can. Ratepayers may perceive you as just wanting to get more of their money (playing politics).

Finally, after you have done the analysis made your case to your customers and received approval from your oversight authority, adjust rates and track results. It is very important to keep careful accounting of you expenses and revenues. Don't overspend just because you have more money coming in, but don't skimp on necessary expenditures just to save money for an imaginary rate decrease. Again, your accounts should be open to public scrutiny. Show your customers that they are getting a good value for their dollar and you'll have allies now and in the future.

This concludes our series of Financial Management articles. If you have any questions, please contact Dick Darling at 287-7806 or at dick.darling@maine.gov

Approved Training

January 11, 2005 in York, ME – Three Stooges of Water and Wastewater Testing - Sponsored by MRWA – (207) 729-6569 – Approved for 4 hours

January 11, 2005 in Old Orchard Beach, ME - Sanitary Sewer Overflows & CMOM- Sponsored by WPETC - 207-761-2991 – Approved for 4 hours

January 12, 2005 in Augusta, Greenville*, Presque Isle* and Farmington*. ME – Three Stooges of Water and Wastewater Testing - Sponsored by MRWA – (207) 729-6569 – Approved for 4 hours (* ATM Locations)

January 13, 2005 in Bangor, ME – Three Stooges of Water and Wastewater Testing - Sponsored by MRWA – (207) 729-6569 – Approved for 4 hours

January 12, 2005 in Houlton or Caribou ME - Preparing for Laboratory Audits & How to Write Laboratory Standard Operating Procedures (SOPs) - Sponsored by WPETC - 207-761-2991 – Approved for 4 hours

January 13, 2005 in Brewer ME –
Ladder Safety, Fall Protection Confined
Space Retrieval & Chainsaw Safety -
Sponsored by WPETC - 207-761-2991 –
Approved for 4 hours

February 16, 2005 in Brewer ME -
Preparing for Laboratory Audits & How
to Write Laboratory Standard Operating
Procedures (SOPs) - Sponsored by
WPETC - 207-761-2991 – Approved for
4 hours

January 20, 2005 in Brewer ME – Cross
Connection Control: The Fundamentals -
Sponsored by WPETC - 207-761-2991 –
Approved for 3 hours

January 27, 2005 in Norway ME – Cross
Connection Control: The Fundamentals -
Sponsored by WPETC - 207-761-2991 –
Approved for 3 hours

February 2, 2005 in Brewer ME –
Everything you Always Wanted to
Know about BOD Testing - Sponsored
by WPETC - 207-761-2991 – Approved
for 5 hours

February 9, 2005 in Bangor, ME -
Pipebursting: A Practical and Diverse
Rehab Option -Sponsored by JETCC -
207-523-8020 – Approved for 6 hours

March 10, 2005 in Waterville ME –
Everything you Always Wanted to
Know about BOD Testing - Sponsored
by WPETC - 207-761-2991 – Approved
for 5 hours

February 10, 2005 in Portland ME –
BEACH Program & Enterococci Testing
- Sponsored by WPETC - 207-761-2991
– Approved for 5 hours

February 16, 2003 in Waterville, ME -
Sanitary Sewer Overflows & CMOM -
Sponsored by JETCC - 207-523-8020 –
Approved for 6 hours

February 17, 2005 in Augusta ME –
Fats, Oils & Grease (FOG):
Management Strategies - Sponsored by
WPETC - 207-761-2991 – Approved for
3 hours

March 3, 2005 in Augusta, ME - Motor
System Management - Sponsored by
JETCC - 207-523-8020 – Approved for
6 hours

March 8, 2005 in Presque Isle, ME -
Understanding your Laboratory QA/QC
CD - Sponsored by JETCC - 207-523-
8020 – Approved for 6 hours

March 9, 2005 in Brewer, ME -
Understanding your Laboratory QA/QC
CD - Sponsored by JETCC - 207-523-
8020 – Approved for 6 hours

March 16, 2005 in Presque Isle, ME -
Centrifugal Pump Hydraulic Application
- Sponsored by JETCC - 207-523-8020 –
Approved for 6 hours

March 24, 2005 in Auburn, ME -
Understanding your Laboratory QA/QC
CD - Sponsored by JETCC - 207-523-
8020 – Approved for 6 hours

March 24, 2005 in Portland ME – Fats,
Oils & Grease (FOG): Management
Strategies - Sponsored by WPETC -
207-761-2991 – Approved for 3 hours

February 23, 2005 in Caribou ME – GIS
& Asset Management - Sponsored by
WPETC - 207-761-2991 – Approved for
3 hours

February 24, 2005 in Portland ME –
Biological Selectors - Sponsored by
WPETC - 207-761-2991 – Approved for
4 hours

April 7 & 8, 2005 in Bangor, ME - Basic
Microscopy & Filamentous Bacteria
Identification - Sponsored by JETCC &
NEIWPCC - 207-523-8020 – Approved
for 6 hours

April 13, 2005 in Topsham ME –
Wastewater Treatment: The
Fundamentals - Sponsored by WPETC -
207-761-2991 – Approved for 6 hours

April 14, 2005 in Brewer ME – Lockout/
Tagout & Confined Space Entry -
Sponsored by WPETC - 207-761-2991 –
Approved for 5 hours

April 21, 2005 in Augusta, ME - Tricks
to By-Pass Pumping - Sponsored by
JETCC - 207-523-8020 – Approved for
6 hours

April 24, 2005 in Topsham ME – Math
for Wastewater Operators - Sponsored
by WPETC - 207-761-2991 – Approved
for 5 hours

April 27, 2005 in Orono, ME -
Biological Process Control - Sponsored
by JETCC - 207-523-8020 – Approved
for 6 hours

April 28 & 29, 2005 in Portland -
Advanced Activated Sludge - Sponsored
by JETCC & NEIWPCC - 207-523-8020
– Approved for 6 hours

May 3, 2005 in North Vassalboro, ME -
Corrosion Management in Potable
Waters: It's Not Just Water Chemistry -
Sponsored by JETCC - 207-523-8020 –
Approved for 3 hours

May 3, 2005 in North Vassalboro, ME -
Verifying the Water/Wastewater
Treatment Processes - Sponsored by
JETCC - 207-523-8020 – Approved for
3 hours

May 4, 2005 in Kennebunkport, ME -
Ten Best Kept Water & Wastewater
Process Management Secrets -
Sponsored by JETCC - 207-523-8020 –
Approved for 6 hours

Note:

WPETC stands for Wright Pierce
Environmental Training Center.
JETCC stands for Joint Environmental
Training Coordinating Committee
MRWA stands for Maine Rural Water
Association
MWWCA stands for Maine Wastewater
Control Association
NEIWPCC stands for New England
Interstate Water Pollution Control
Commission

Certification News

The Spring 2005 wastewater operator
certification exam will be given on **May**
11, 2005 in the usual locations.

Applications must be postmarked by
March 26, 2005 or delivered to the DEP
Augusta office by March 28, 2005.

Answers to *For Practice*:

1. d. The term Chlorine Demand means the difference between the amount of chlorine added (the dosage) and the amount of chlorine remaining in the effluent (the residual).

2. c. MCRT =

$$\frac{\text{pounds of sludge in aeration tanks}}{\text{lbs sludge wasted / day} \div \text{lbs solids in effluent}}$$

rearranging the equation:

$$\text{lbs wasted} \div \frac{\text{lbs in aeration tank}}{\text{MCRT}} = \text{lbs in effluent}$$

Solve using the data given:

$$\text{Lbs in Aeration Basin} = .25 \text{ MG} \times 2256 \times 8.34$$

$$\text{Lbs in Aeration Basin} = 4,704 \text{ pounds/day}$$

$$\text{Lbs in Effluent TSS} = .45 \times 18 \times 8.34$$

$$\text{Lbs in Effluent TSS} = 68 \text{ pounds/day}$$

Determine the pounds to be wasted:

$$\text{Lbs wasted} = 4704/18 - 68$$

$$\text{Lbs wasted} = 193 \text{ lb/day}$$

Determine the gallons to be wasted:

$$\text{Gal wasted} = \frac{\text{lbs wasted} \div 1,000,000}{\text{waste sludge conc} \div 8.34}$$

$$\begin{aligned} \text{Gal Wasted} &= (193 \times \\ &1,000,000) / (8000 \times 8.34) \text{ Gal} \\ \text{Wasted} &= 2,893 \text{ gallons} \end{aligned}$$

3. a. In the formula for calculating the flow through a pipe, the factor "C" is the roughness coefficient.

4. b. A perfectly uniform sand would mean that every sand particle would have the same size. The uniformity coefficient would be 1.0